

WHAT IS CLAIMED IS:

1. A direct fuel-injected system for an internal combustion engine having at least one combustion chamber, comprising a high pressure fuel pump for developing high pressure fuel, a fuel injector to directly inject fuel into the combustion chamber of said engine, the fuel injector receiving high pressure fuel from the fuel pump, and a pressure dampening device in communication with the fuel injector.

2. A direct fuel-injected system as set forth in Claim 1, wherein said pressure dampening device is an elastic conduit.

3. A direct fuel-injected system as set forth in Claim 2, wherein said elastic conduit comprises an inner member that is made of an elastic material, a middle member made of a material having greater tensile strength than the inner material, and an outer protective member.

4. A direct fuel injected system as set forth in Claim 2, wherein said inner member is made of a rubber.

5. A direct fuel injected system as set forth in Claim 3, wherein said middle member is made of a resin fiber material.

6. A direct fuel injected system as set forth in Claim 4, wherein said outer-protective member is made of rubber.

7. A direct fuel injected system as set forth in Claim 2, wherein said fuel system further includes a fuel rail that supplies fuel to said fuel injector and said elastic conduit device supplies fuel to said fuel rail.

8. A direct fuel injected system as set forth in Claim 1, wherein said fuel system further includes a fuel rail that supplies fuel to said fuel injector and said pressure dampening device is connected to an end of said fuel rail downstream of said fuel injector.

9. A direct fuel injected system as set forth in Claim 8, wherein said pressure dampening device is an elastic conduit with a plugged end.

10. A direct fuel injected system as set forth in Claim 1, wherein said engine is enclosed within a protective cowl and includes a vertically disposed crank shaft and two banks of cylinders in a V-type configuration, said fuel system further including a fuel rail that is secured to a cylinder head of each bank of cylinders and said pressure dampening device is connected to at least one end of the fuel rail.

11. A direct fuel injected system as set forth in Claim 10, wherein the pressure dampening device is connected to a lower end of the fuel rail.

12. A direct fuel injected system as set forth in Claim 11, wherein the pressure dampening device is an elastic conduit plugged at one end.

5 13. A direct fuel injected system for an internal combustion engine having at least one combustion chamber, comprising a high pressure fuel pump for developing high pressure fuel, a fuel injector to directly inject fuel into the combustion chamber of said engine, a pressure regulator to regulate fuel pressure within the fuel system, and a fuel pressure sensor for sensing a fuel pressure of the fuel, said fuel pressure sensor being secured to said engine through a vibration damping apparatus.

10 14. A direct fuel injected system as set forth in Claim 13, wherein said fuel pressure sensor is positioned between said fuel pump and said pressure regulator.

15 15. A direct fuel injected system as set forth in Claim 13, wherein said fuel system further includes a fuel rail that supplies fuel to said fuel injector and said fuel pressure sensor is connected to said fuel rail downstream of said fuel injector.

20 16. A direct fuel injected system as set forth in Claim 13, wherein said vibration damping apparatus includes dampening materials.

25 17. A direct fuel injected system as set forth in Claim 13, wherein said vibration damping apparatus includes a first and a second dampening material, said first dampening material being stiffer than the second dampening material.

30 18. A direct fuel injected system as set forth in Claim 13, wherein said vibration damping apparatus includes an electronic control box for housing an electronic control unit.

35 19. A direct fuel injected system as set forth in Claim 18, wherein said vibration damping apparatus further includes a fuel injector driver box for housing an injector control unit.

40 20. A direct fuel injected system as set forth in Claim 19, wherein said pressure sensor is mounted onto said fuel injector driver box.

45 21. A direct fuel injected system as set forth in Claim 20, wherein said electronic control box is mounted on said engine and is insulated from engine vibrations by a first dampening material.

22. A direct fuel injected system as set forth in Claim 21, wherein said fuel injector driver box is mounted on said electronic control box and is insulated from the vibration of the electronic control box by a second dampening material.

23. A direct fuel injected system as set forth in Claim 22, wherein said first dampening material is stiffer than the second dampening material.

24. A direct fuel injected system for an internal combustion engine comprising a high pressure fuel pump for developing high pressure fuel, a fuel injector to directly inject fuel into a combustion chamber of said engine, a fuel pressure sensor that communicates with said fuel system for measuring a fuel pressure within said fuel system, and means for protecting the fuel pressure sensor from damage caused by engine vibrations.

25. A direct fuel injected system for an internal combustion engine comprising a high pressure fuel pump for developing high pressure fuel, a fuel injector to directly inject fuel into a combustion chamber of said engine, a fuel pressure sensor that communicates with said fuel pressure sensor for measuring a fuel pressure within said high pressure fuel system, and means for reducing fuel pressure fluctuations within said fuel system.

26. A direct fuel injected system as set forth in Claim 25, wherein said fuel system further includes a fuel rail to supply fuel to said injector and said means for reducing fuel pressure fluctuations within said fuel system is located between a said high pressure fuel pump and said fuel rail.

27. A direct fuel injected system as set forth in Claim 25, wherein said fuel system further includes a fuel rail to supply fuel to said injector and said means for reducing fuel pressure fluctuations within said fuel system is located at an end of said fuel rail downstream of said fuel injector.

28. A direct fuel injected system for an internal combustion engine having at least one combustion chamber, comprising a high pressure fuel pump for developing high pressure fuel, a fuel injector to directly inject fuel into the combustion chamber of said engine, the fuel injector receiving high pressure fuel from the fuel pump, a fuel pressure sensor for sensing a fuel pressure of the fuel, said fuel pressure sensor being secured to said engine through a vibration damping apparatus and a pressure-dampening device in communication with the fuel injector.